USER'S MANUAL

Vertical Flow Benches

PV-100·AV-100·BV-100·CV-10
PV-30/70·AV-30/70·BV-30/70·CV-30/70

Telstar®
Life Science solutions

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1. GENERAL DATA

Operating Instructions Manual for vertical laminar flow sterile benches:

Models: **- PV-100 and PV-30/70**

- AV-100 and AV-30/70

- BV-100 and BV-30/70

- CV-100 and CV-30/70

WARNING

These operating instructions must be read before starting up the laminar flow bench. Follow all the safety measures given in these operating instructions. Unplug the bench before attempting any Maintenance operation. Any use or application of the bench not according to the recommendations stated in these operating instructions may result in a dangerous situation and/or the loss of the manufacturing guarantee.

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2. BENCH DATA

2.1. OPERATION

The vertical flow benches are equipped with high efficiency centrifugal fans.

The outer safety cabinet is made of oven dried lacquered sheet steel, functional in design, small outside dimensions and front access for filter changing.

The air blown by the fan (1) discharges into a chamber/plenum (2) where it is filtered through the HEPA absolute filter (3) before arriving at the working area (4) in laminar form, obtains this process Class 10 according to the US. Fed. Std. 209 D (see Annex A1.).

2.2. APPLICATION

Series 100

This model of recycled vertical laminar flow sterile bench is designed for handling samples or products when the Class 10 sterile protection must be guaranteed in the working area, as well as a basic level protection to the user and the environment.

Series 30/70

The air extraction and recycled vertical laminar flow sterile bench is designed for handling samples or products when the Class 10 sterile protection must be guaranteed in the working area, as well as a good level of protection to the user and the environment.

See principle diagram in Annex A1.

WARNING

Never handle products or samples in the presence of corrosive, inflammable or explosive gasses. Never handle products or samples that are biologically pathogenic or likely to harm in any way the user or the environment. Never handle cytostatics (chemotherapy) or radiological samples.

2.3. COMPONENTS DESCRIPTION

See Paragraph 10.

2.4. CERTIFICATION

Control of quality and certification with the results of the trials carried out according to Norms. Certificate is located in the interior of the safety cabinet.

2.5. TECHNICAL FEATURES

Features	**Units**	**PV-100·30/70**	**AV-100·30/70**	**BV-100·30/70**	**CV-100 30/70**
External dimensions	LxWxH mm	802x845x1290	1260x845x1290	1565x845x1445	1870x845x1445
Internal dimensions	LxWxH mm	772x670x700	1230x670x700	1535x670x700	1840x670x700
Total flow rate / Air velocity	m^3/h-m/s	736-0,40 869-0,40	1178-0,4 1392-0,40	1473-0,40 1741-0,40	1768-0,40 2089-0,40
Power	KW	1/(0,8)	1,5/(1,3)	1,5/(1,3)	1,1/(0,9)
Weight	Kg.	100/110	140/150	160/170	190/205
Vibration	Mm RMS	<0,005	<0,005	<0,005	<0,005
Lighting	Lux	>750 lux			
Noise level	dB (A)	<60			
HEPA/ULPA H14 Filter		Efficiency: >99,999 % (DOP) Class 10			
Tension	V	230/(110*)			
Fans		High efficiency centrifugals.		Axials	
Power supply		See features plate in cabinet.			

*Under request.

3. TRANSPORT

The bench is shipped in single crates and in such a way to avoid transport damage.

This Manual as well as the control certificate are supplied with the safety cabinet.

4. INSTALLING INSTRUCTIONS

For a correct vertical laminar flow bench start-up procedure, follow these instructions step by step.

4.1. PLACEMENT

a) Special care should be taken when unpacking to avoid damaging the glass front and the microprocessor display.

b) Cabinets should be located away from doorways, passageways, air diffusers and the like, which would influence cabinet airflows.

c) The safety cabinet should be positioned perfectly steady on the table so that no vibrations are produced.

d) It is advisable to keep the room temperature within the limits of working comfort in order to prevent over-heating of the working area.

e) Modification of room air conditioning inlet diffusers to deflect air away from cabinets, or to reduce room inlet air velocity should be considered when necessary.

Sidewall air diffusers are unsuitable for rooms where cabinets are installed

f) As ceiling height will have an effect on air distribution, consideration should be given to the selection of site clearance. A flat height of 3 m. is preferable.

g) In order to minimise resistance to exhaust airflow and to facilitate filter maintenance, the cabinet installation should provide a clearance in the direction of exhaust discharge of at least 600 mm. Some cabinet designs and sizes may require additional clearance.

h) Personnel traffic generates air movements, which could cause sudden loss of barrier containment. Warning signs or other measures to inhibit traffic during critical manipulations should be considered.

Partitioning of cabinet locations may be used to reduce the effects of air movements from other cabinets, and from personnel traffic.

i) All windows should be fixed.

j) The sudden opening and closing of doors can disrupt cabinet airflows, and should be avoided when cabinets are in use.

k) The cabinet location will directly influence the sound level. The level will increase significantly in small rooms with highly reflective surfaces, because of the proximity of cabinets to walls and where fan speeds have been increased to compensate for room air currents or increased filter resistance.

l) Cabinets should be re-tested prior to use, following any modification of the room or the air supply system which could significantly change room airflow characteristics.

4.2. WARNINGS FOR THE FIRST CONNECTION

- Before connecting to the mains, clean the bench in a general way so that all the dust particles accumulated during transport are removed. Follow the cleaning and disinfecting instructions.

- Make the required electrical connection (see the description plate).

- Before working for the first time, start the cabinet to blow through the filters and leave it on for about 6 hours.

The new filter gives off a characteristic smell, which tends to disappear after a short while.

4.3. ELECTRICAL CONNECTION

The safety cabinet will be supplied with single-phase electric fans and a flow switch (1) placed in the control panel (Fig. 2).

The electronic control panel has protecting fuses.

WARNING

Before switching on the cabinet, check that the supply mains coincides with the data given in the characteristics plate.

The bench may be activated only with the switch placed in the top right side.

The plant or machine where the bench is connected to must comply with the prevailing safety rules in every country.

4.4. STARTING UP

After dealing with the above points, set the key switch to start up the laminar flow bench which is at the top right side, ensuring that the suction air area is clear.

4.5. SWITCHING OFF

To stop the cabinet, just turn the switch (Fig. 2 pos. 1) into the Off position.

4.6. STOPPING FOR LONG PERIODS

In the event of a long stop, avoid, as much as possible, the accumulation of dust and when using the bench again, proceed as if it were started for the first time. See paragraph 4.2.

5. INSTRUCTIONS FOR USE

5.1. GENERAL RECOMMENDATIONS

- The bench working area must not be used as a laboratory equipment store. This may cause an unnecessary presence of dust, which endangers sterility.

- Even if the working area is in a clean sterile laminar flow, the bench surroundings may be contaminated. The contaminating sources must be detected in order to avoid them while introducing the arms, material, etc.

- All the material necessary for the work must be particle free and previously cleaned.

- Do not put inside the working area materials such as: paper, wood, cardboard, pencils, erasers, etc. since they give off a lot of particles.

- It is recommended to wash arms, hands and finger nails with a germicidal soap before and after working. The users must avoid touching their mouth and eyes.

- It is recommended to use long sleeved overalls with tight cuffs, and, with special work, protecting gloves. (Alternatively use mittens). Both the overalls and the mittens must be made of a material which gives off as few fibres and particles as possible.

- Start the bench 10 minutes before beginning your work with it. Thus the working area and the material introduced are scavenged and the particles removed.

- Whenever pipettes are used, they must be the mechanical suction type. Never use them with mouth suction since you are very likely to inhale the aerosol originated by the suction.

- Whenever platinum handles must be used, we suggest the use of electrical incinerators and even disposable ones, if possible.

- If the work to be done requires the use of a Bunsen burner, or similar gas flame, we recommend those with a constant pressure button. Remember that an excessively long flame might burn the absolute filters and bend the light diffuser.

- The shadows and whirls caused by the objects, equipment and material surrounding the working area must be examined before starting the operation, in order to determine their possible effects. Remember that the airflow does not go back to its laminar condition before a distance 2,5 times the diameter of the object causing the obstruction.

- When vials and tubes are used, we recommend the use of screw caps instead of cotton ones, the latter giving off a lot of particles.

- Once the operation is finished, all disposable products (handles, Petri Plates, etc.), and the culture medium, samples, tubes, vials, etc. will be removed from the bench inside impermeable and sterilizable bags, if necessary.

- When working with the bench or during its cleaning operations, special care must be taken not to damage the HEPA filters by hitting them, pouring liquids, splashing, etc.

5.1.1. ERGONOMICS

For security, the user should keep in mind the positions adopted during the job carried out in the safety cabinet.

Find as follows, examples of positions NOT recommended.

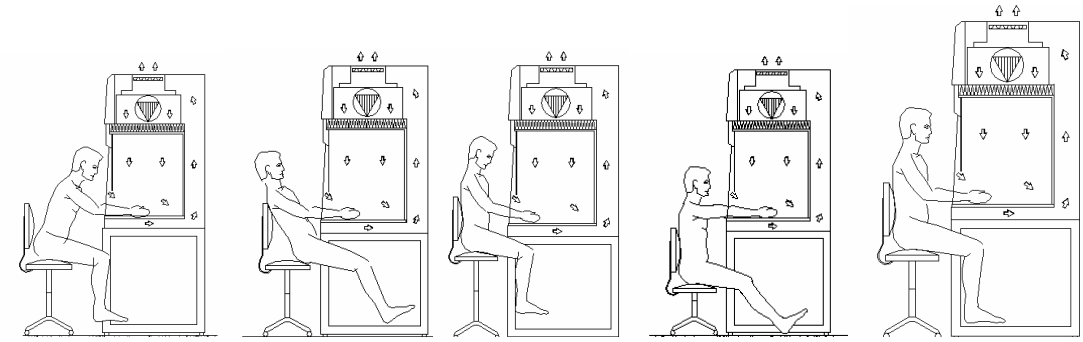


Fig. A – X **Fig. B – X** **Fig. C – X** **Fig. D – X** **Fig. E - √**

Adjusting the seat to adopt a correct position will allow the user to work within safety conditions and moreover to avoid possible physical damages (sight, cervical, back, etc.).

Besides protection of the product and the user, it is necessary the safety cabinet be located in a place where no current can be produced that would cause turbulence in the laminar flow.

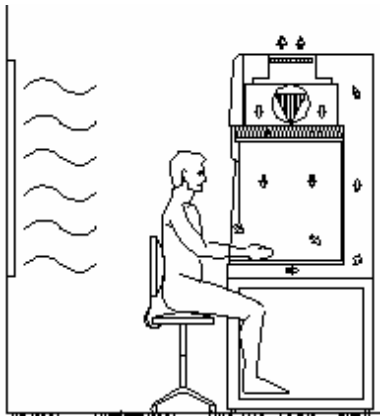


Fig. F - X

5.2. CONTROL PANEL

Components description (Fig. 2).

Thickness of the control dial: 3 mm.

2x16 LCD display with 3x5.5 mm characters for the different indications and programs.

Six buttons.

Control dial functions:

- Button (1): connects the fan (on/off). By default, the fan speed is set at standards, if you wish it to go slower, you should then press the down button (nr 6).

- Button (2): connects the light (on/off), linked with the UV germicidal lamp button (nr 3).

- Button (3): connects UV germicidal lamp (on/off), linked electrically with the lighting switch (nr 2).

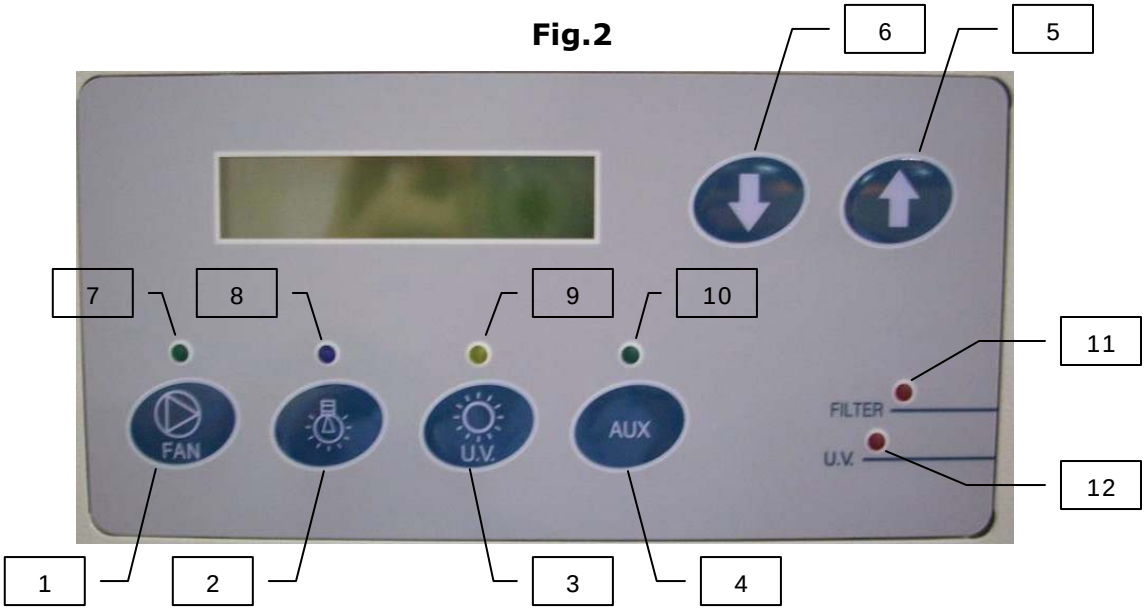
To connect the UV lamp with a timer, you should press the button (nr 3) and start it up. The button (5) activates or disactivate the timer.
Steps to follow to program the timer for the UV lamp:
1.- You should start with the UV lamp switched off.
2.- Press the down button (nº6).
3.- Select the time, from 1 to 59 minutes, using the up and down buttons (nr 5/nr 6).
4.- Confirm with the UV's start button (nr 3).

- Button (4): connects the AUX output for possible safety valves, service plugs, etc.

Signal lights, alarms and display:

- Signal light (nr.7) for air-impulsion system functioning, green.
- Signal light (nr.8) for lighting switched on, blue.
- Signal light (nr.9) for UV germicidal lamp switched on, yellow.
- OPTIONAL. Filter clogging alarm (nr.11), red.
- UV germicidal lamp on (nr.12), red.
- Display functions:
  - The display usually shows TELSTAR and the version of the program.
  - Viewer for hours of air impulsion system and UV germicidal lamp functioning V. (VENT/FAN: 000000h, U V: 000000h) will be activated with the button 5, being the rest of functions stopped.
  - Normal or slow fan speed (velocity) (FAN VEL. STD or ALARM FAN VEL 1/2).
  - Slow speed air impulsion alarm system (ALARM VEL. 1/2).
  - Fix or programmed period of time for UV germicidal lamp (ALARM UV ON or UV ON 12 MIN).
  - UV lamp alarm on (ALARM U. V. ON).
- Filter clogging alarm (ALARM FILTER).

Fig.2



5.3. OPTIONAL ACCESSORIES

The vertical laminar flow benches can have several additional accessories according to the work requirements.

These optional accessories are the following:

- Germicidal lamp (UV) kit (*)

WARNING

When this accessory is used, please take the usual precautions with this type of lamps. It should only be used for the previous external sterilisation of the elements introduced into the bench. Therefore, this lamp is an accessory previous to the operation with the bench, and it is essential to have it off when the user is in front of the table or working at it. The SECURIT glass panes protect from direct radiation but the UV rays are reflected on bright metal parts and might damage the worker's eyes. This is why the germicidal lamp must only be used when nobody is working with the cabinet.

- Gas stop-cock/tap (*)
- Vacuum stop-cock/tap (*)
- Other gasses stop-cock/tap (nitrogen, etc.) (*)

WARNING

When compressed air or nitrogen is used, use an absolute filter in the line to avoid the introduction of particles inside the working area.

- Support table (*)
- Six hook fluid therapy rod (*)
- HEPA/ULPA absolute filters clogging optical alarm.

(*) The user referring to the diagrams added to these Operating Instructions can easily assemble these accessories. Fig. 4, 5, 6 and 7.

5.4. OPTIONAL PARTS LIST

CODE	DESCRIPTION
1283	Germicidal lamp kit for PV-100 AND PV-30/70
1282	Germicidal lamp kit for the other vertical benches belonging to series 100 and 30/70
11253	Gas stop-cock/tap
11220	Vacuum stop-cock/tap
11254	Compressed air stop-cock/tap
45485+45469	Support table for PV-100 and PV-30/70
45485+44541	Support table for AV-100 and AV-30/70
45485+44542	Support table for BV-100 and BV-30/70
45485+44434	Support table for CV-100 and CV-30/70
1971	HEPA filters clogging optical alarm
46377+39576	Bunsen burner with foot pedal

6. MAINTENANCE INSTRUCTIONS

WARNING

Unplug the bench before attempting any Maintenance or disassembling intervention. Usually one regular test should be performed every year checking all the elements of the cabinet.

6.1. MAINTENANCE TABLE

The frequency given in the maintenance table for each operation, and especially that of the filter replacement, are recommended indicative values for normal use of the bench. Harder working conditions may shorten the intervals stated in the following table.

Maintenance table

OPERATION	PERIODICITY
Validation and leak control according to the Norms	At least once a year
Air extraction prefilter cleaning	Every 500 hours of operation
Air extraction prefilter replacement	Every 1000 hours of operation or once a year
Blowing/extraction absolute filters replacement	Every 3000/4000 hours of operation

6.2. REGULAR VALIDATION AND CONTROL

The International Rules recommend a regular validation and control (at least once a year). The tests to be performed must be the same done at the last manufacturing stage, issuing a result certification.

6.3. PREFILTERS (SERIE 100)

The vertical laminar flow sterile benches have some prefilters in the air intake section. These must be cleaned or vacuum cleaned every 500 hours and replaced every 1000 hours.

6.4. ABSOLUTE FILTER

The average life of the HEPA filters with these benches is of about 4000/5000 hours, which is indicated by the machine elapsed time meter (Fig. 2 display).

After this period of time, the blown air volume decreases due to the lower filter load, being a mechanical filter process, which results in lower filter efficiency.

WARNING

In order to be able to guarantee the right assembling and fitting of the filter, as well as the lack of leaks, the filter replacement operations should be performed by specialised technicians, with the necessary checking tools: air speed indicator, leak detector, aerosol generator, etc.

7. BENCH ASSEMBLY AND DISASSEMBLY INSTRUCTIONS

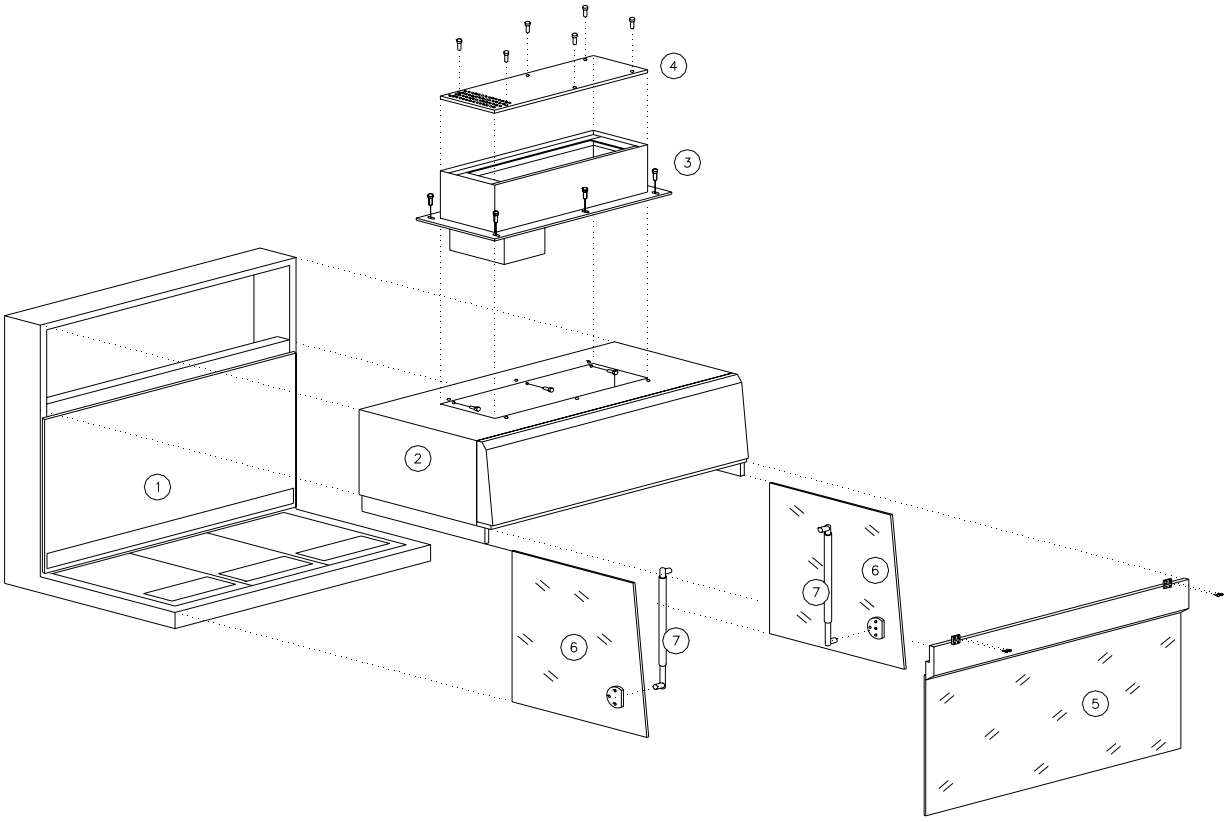


Fig. 3

1. FRAME
2. HEADPIECE
3. AIR OUTLET PLATE
4. SUCTION ROD
5. FRONT PANEL
6. GAS SPRINGS

VERTICAL BENCHES
PV – 30/70
AV – 30/70
BV – 30/70
CV – 30/70

ASSEMBLING INSTRUCTIONS

A. Fasten the headpiece (2) to the frame (1) with the M8 bolts.

B. Fit the air outlet plate (3) on the top of the headpiece (2).

C. Place the front screen (4) on the air outlet plate (3), tightening it in the headpiece (2) with bolts M5.

D. Fit the two side walls glasses.

E. Fit the front screen (5) and the M4 hinge bolts.

F. Fit the two-gas spring's (6) turning their ball and socket joint of M8 in each support.

G. To disassemble follow the same steps in the opposite order.

8. INSTRUCTIONS TO ASSEMBLE OPTIONAL ACCESSORIES

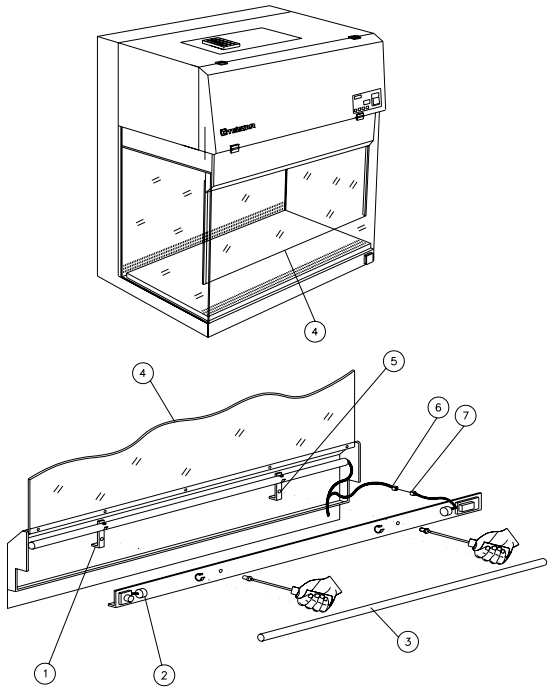
8.1. U.V. GERMICIDAL KIT

The Germicidal Kit is easy to install, following the instructions (Fig. 4). The "UV" button on the control panel (Fig. 2 pos. 3) switches it on. This button is electrically engaged with the light button for safety reasons.

WARNING

The UV ray radiation is harmful to people. Absolutely never work while the U.V. rays are on.

8.1.1. INSTRUCTIONS



1.- Support 1
2.- Germicidal kit
3.- Fluorescent lamp
4.- Front screen.
5.- Support 2
6.- Plug 3
7.- Plug 4

Fig. 4

A. Lift front screen (4).

B. Remove fluorescent lamp (3) from germicidal kit (2).

C. Fit the germicidal kit (2) to the supports 1 and 2 (1 and 5), using the M4 bolts to fasten it.

D. Put the fluorescent lamp back into its place (3).

E. Connect plugs 3 and 4 (6 and 7).

F. Lower front screen (4).

G. To disassemble follow the same steps in the opposite order.

8.2. STOP COCK / TAP FOR GAS, VACUUM, AIR, NITROGEN, ETC.

In both cabinet sides, right and left (security glass), there are two holes to house the intakes for this fluid; follow the instructions. (Fig. 5).

8.2.1. INSTRUCTIONS

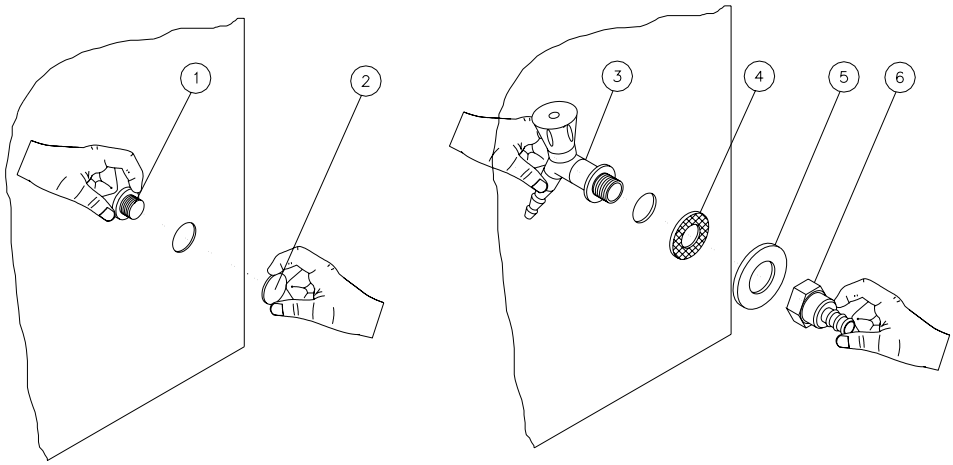


Fig. 5

1.- Cap	4.- Rubber joint
2.- Adhesive	5.- Washer
3.- Stop-cock	6.- Pipe nipple and nut

a) Remove the glass cap (1) and the adhesive (2) from the bench.

b) Place the stop-cock (3) in the side hole.

c) Place the rubber joint (4) and the washer (5).

d) Fasten the stop-cock (3) using the pipe nipple and the nut (6).

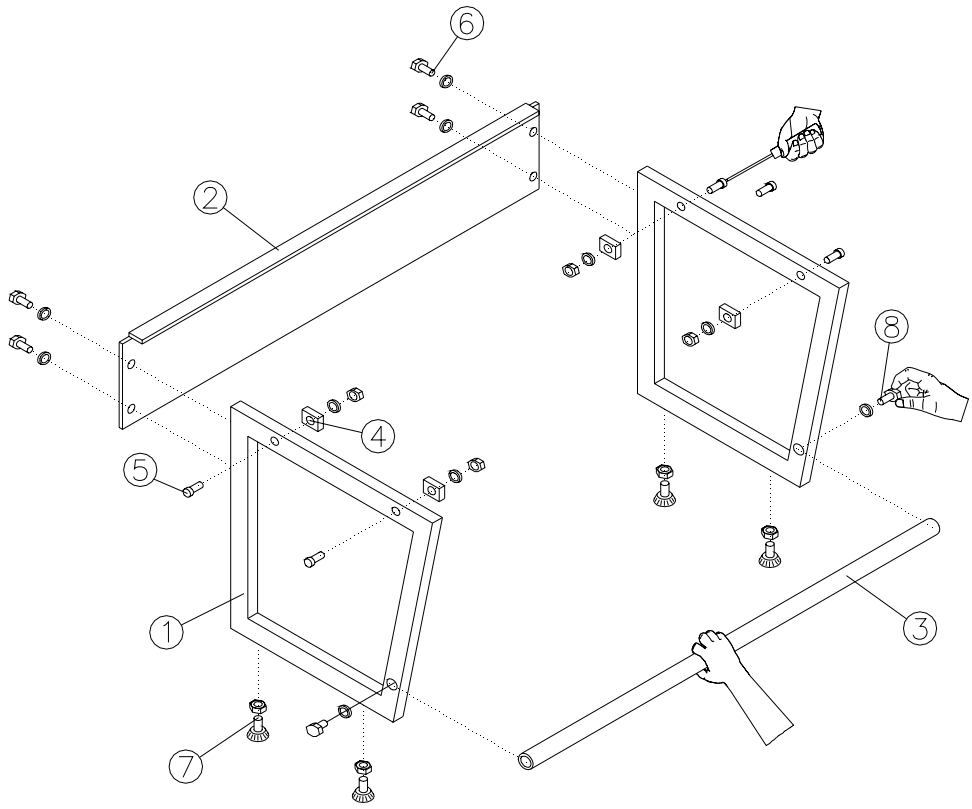
REMARK: Is necessary to use a joint sealer for the stop cock.

8.3. SUPPORT TABLE

All the models of vertical laminar flow benches may be placed on top of a support table, which is very easy to install (Fig. 6).

8.3.1. INSTRUCTIONS

Fig. 6



1.- Support leg	5.- Sunk screw M6x50, hexagonal nut M6 and washer M6
2.- Support union front panel	6.- Hexagonal screw M6x10, washer M6
3.- Feetrest	7.- -Rubber support AR-M10, hexagonal nut M10
4.- Pad	8.- Hexagonal bolt M8x60, washer M8

a) Fasten the front panel (2) on the supports (1), using the washers and sunk screws M6 (6).

b) Put the feetrest (3), and fasten it with the washers and hexagonal bolts M8 (8).

8.4. OTHER ACCESSORIES

The other accessories must be ordered with the rest of the equipment and assembled in the factory.

9. CLEANING AND DISINFECTING

See Annex A2.

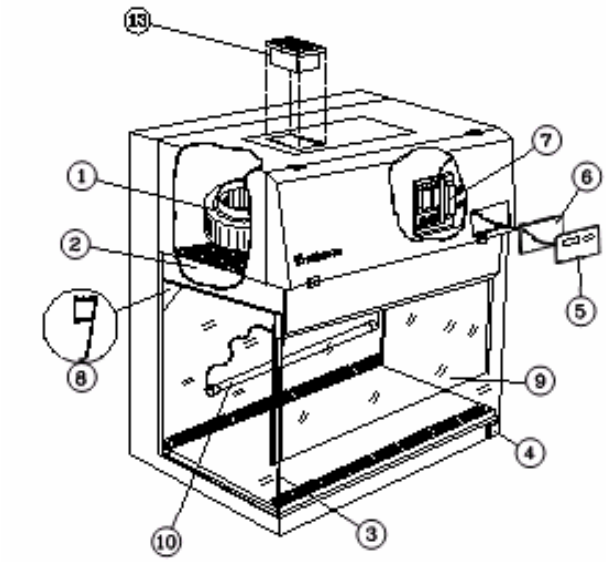
10. LIST OF SPARE PARTS

This list of spare parts will valid from September 2002 (manufacturing).

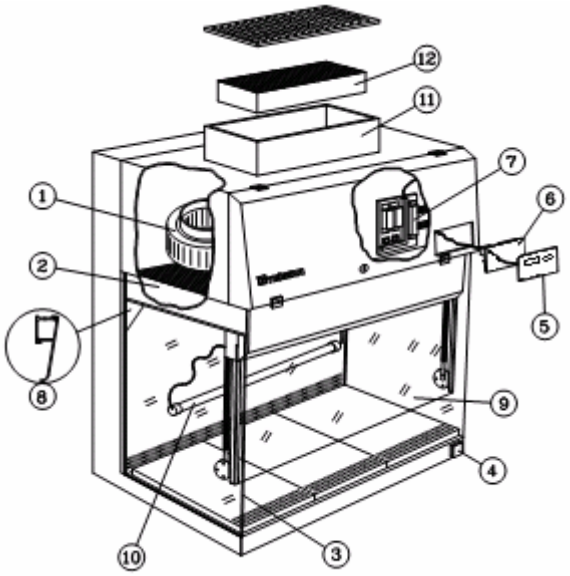
The only way to guarantee the adequate vertical laminar flow bench operation is to use original parts and accessories.

When ordering spare part indicate bench type and serial number.

SERIE 100



SERIE 30/70



10.1. COMPONENTS PV-100 / PV-30/70

NO.	REF	DESCRIPTION	QTY
1	1403	Laminar flow fan	1
2	1235	HEPA filter 762x610x68 mm.	1
3	11423	Grey side wall vidur glass	2
4	510032	Electrical plug	1
5	15463	Control dial	1
6	43828	Electronic control card	1
7	18430	Electrical box	1
8	1918	Filter holding aluminium blade	1
9	1259	Transparent front vidur glass	1
10	11164	Fluorescent lamp 18W	1
11	1911	Conversion case from *Series 100* to *Series30/70*	1
12	11273	HEPA FILTER 381x381x68 mm (*Series 30/70*)	1
13	1043	Extraction prefilter assembly *(Series 100)*	1

10.2. COMPONENTS AV-100 / AV-30/70

NO.	REF	DESCRIPTION	QTY
1	1403	Laminar flow fan	2
2	1477	HEPA filter 1220x610x68 mm.	1
3	11423	Grey side wall vidur glass	2
4	510032	Electrical plug	1
5	15463	Control dial	1
6	43828	Electronic control card	1
7	18430	Electrical box	1
8	1879	Filter holding aluminium blade	1
9	1187	Transparent front vidur glass	1
10	11153	Fluorescent lamp 36W	1
11	31403	Conversion case from *Series 100* to *Series 30/70*	1
12	11272	HEPA FILTER 762x305x68 mm (*Series 30/70*)	1
13	1043	Extraction prefilter assembly *(Series 100)*	1

10.3. COMPONENTS BV-100 / BV-30/70

NO.	REF	DESCRIPTION	QTY
1	1403	Laminar flow fan	2
2	1237	HEPA filter 1525x610x68 mm.	1
3	11423	Grey side wall vidur glass	2
4	510032	Electrical plug	1
5	15463	Control dial	1
6	43828	Electronic control card	1
7	18430	Electrical box	1
8	1916	Filter holding aluminium blade	1
9	1188	Transparent front vidur glass	1
10	11154	Fluorescent lamp 58W	1
11	31403	Conversion case from *Series 100* to *Series 30/70*	1
12	11272	HEPA Filter 762x305x68 mm (*Series 30/70*)	1
13	1043	Extraction prefilter assembly *(Series 100)*	1

10.4. COMPONENTS CV-100 / CV-30/70

NO.	REF	DESCRIPTION	QTY
1	1982	Laminar blow fan	1
2	1238	HEPA filter 1830x610x68 mm.	1
3	11423	Grey side wall vidur glass	2
4	510032	Electrical plug	1
5	15463	Control dial	1
6	43828	Electronic control card	1
7	18430	Electrical box	1
8	1917	Filter holding aluminium blade	1
9	1258	Transparent front vidur glass	1
10	14411	Fluorescent lamp 30W	2
11	1910	Conversion case from *Series 100* to *Series 30/70*	1
12	11105	HEPA FILTER 610x305x68 mm (*Series 30/70*)	1
13	1043	Extraction prefilter assembly *(Series 100)*	1

11. PRINCIPLE DIAGRAM

See Annex A1

12. CLEANING AND DISINFECTION

See Annex A2

13. MAINTENANCE CHART

See Annex A3

14. ELECTRIC DIAGRAMS

Electric diagram 230V + Components (Annex A4).

Electric diagram 110V + Components (Annex A5).

15. TESTS

15.1. IMPULSION FILTER LEAK TEST

See Annex A6.

15.2. EXHAUST FILTER LEAK TEST

See Annex A6.1.

15.3. IMPULSION AIR VELOCITY TEST

See Annex A6.2.

15.4. EXHAUST FILTER FLOW TEST

See Annex A6.3.

15.5. SMOKE TEST

See Annex A6.4.

15.6. LIGHT TEST

See Annex A6.5.

15.7. NOISE LEVEL TEST

See Annex A6.6.

15.8. PRESSURE TEST

See Annex A6.7.

16. CERTIFICATES

16.1. CE CERTIFICATE

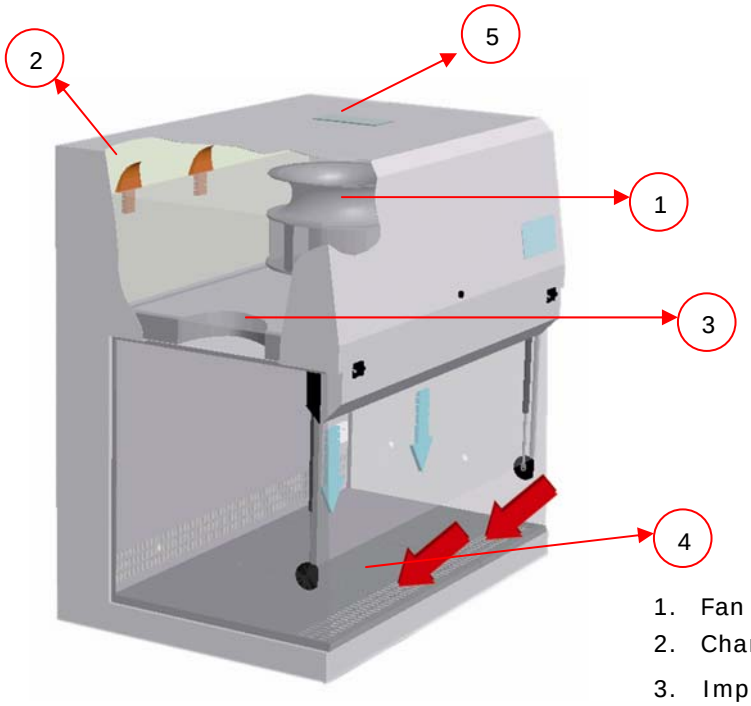
See Annex A6.8.

16.2. GUARANTEE CERTIFICATE

See Annex A6.9.

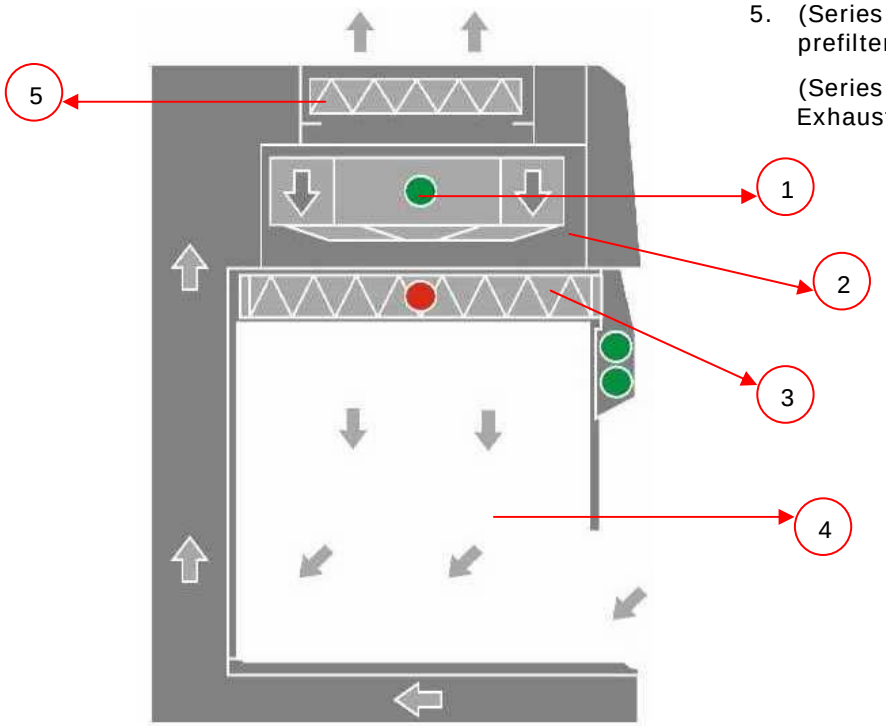
ANNEX A1 PRINCIPLE DIAGRAM

SERIES 100



1. Fan
2. Chamber or plenum
3. Impulsion Filter
4. Working area
5. (Series 100) Exhaust prefilter

   (Series 30/70) Exhaust filter



SERIES 30/70

ANNEX A2 CLEANING AND DISINFECTION

For worktable and sides, use sterile or non-use disable cloths, which do not shed particles or fibres.

To disinfect use cloths dampened with a disinfecting solution which do not damaged or affect the paintwork, stainless steel or glass. A previous clean to disinfecting can also be done with water and soap.

Fig. 1

To accede to corners or difficult access zone, use another type of tools.

Fig. 2

Fig. 3

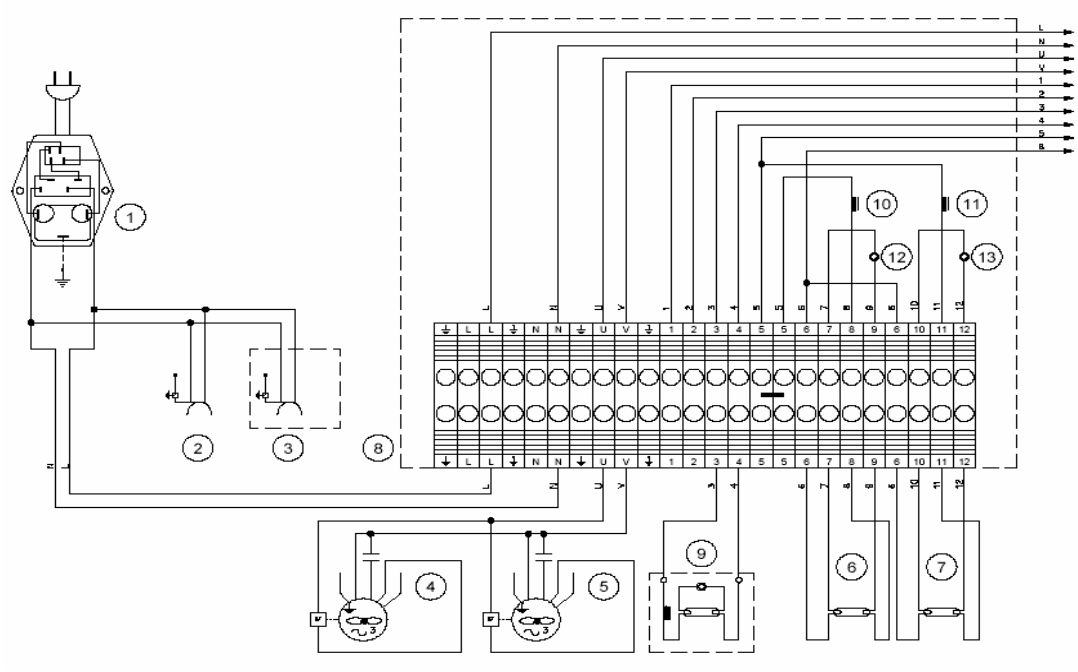
Inside, safety cabinet cleaning is recommended on the following occasions:

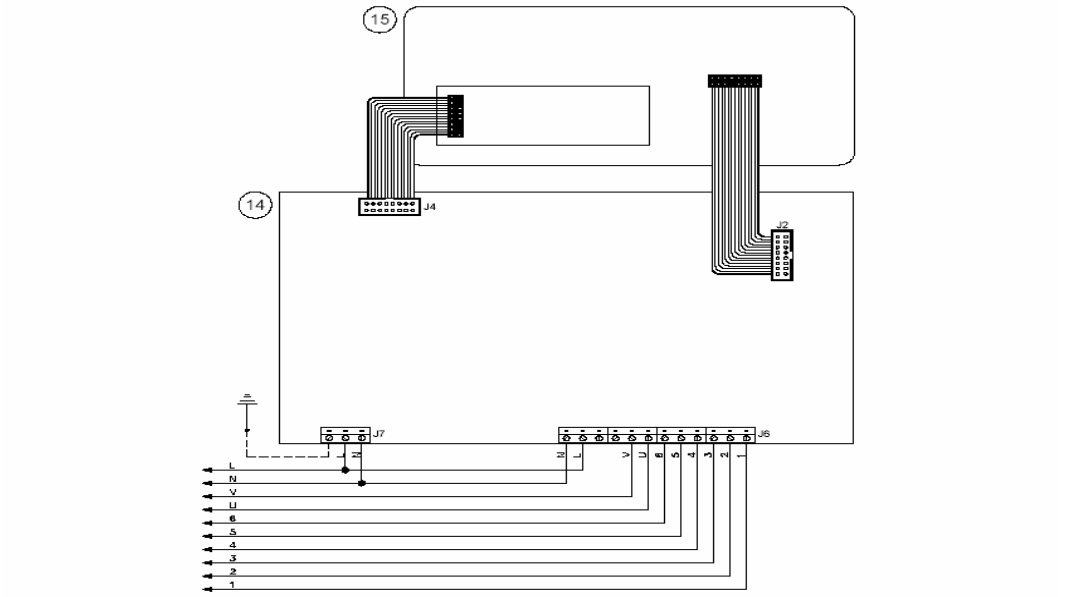
a) Before starting any work in the safety cabinet.
b) After working in the safety cabinet.
c) Whenever there is a change of work programme.
d) In event of liquid spilling on the work table.
e) Before carrying out mechanical or biological control tests in the working area.

ANNEX A3 MAINTENANCE CHART

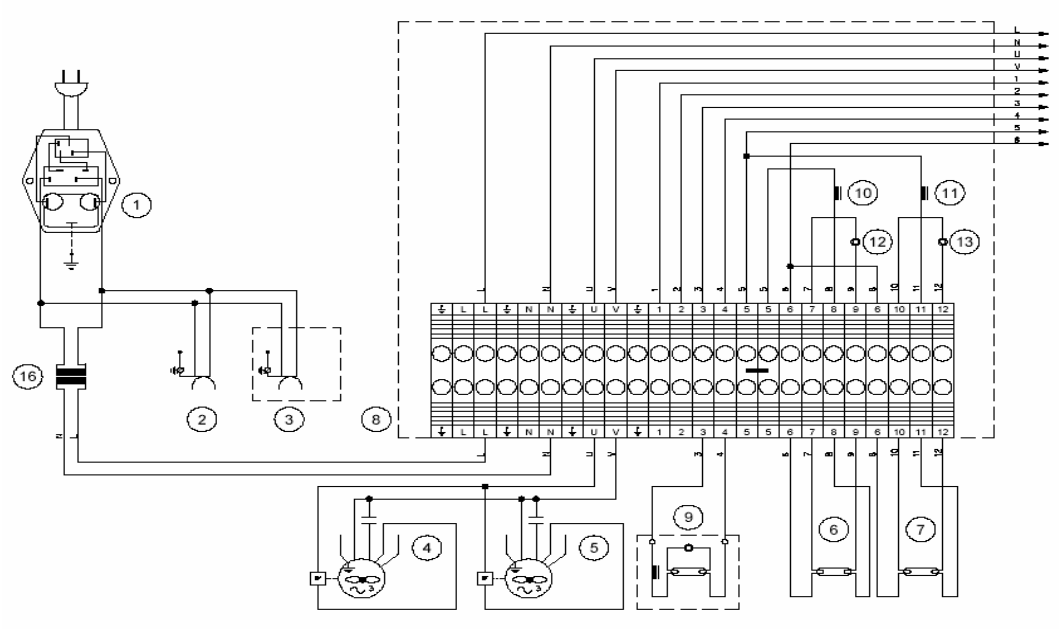
MAINTENANCE CHART			
DATE	**WORK DESCRIPTION**	**NAME**	**SIGNATURE**

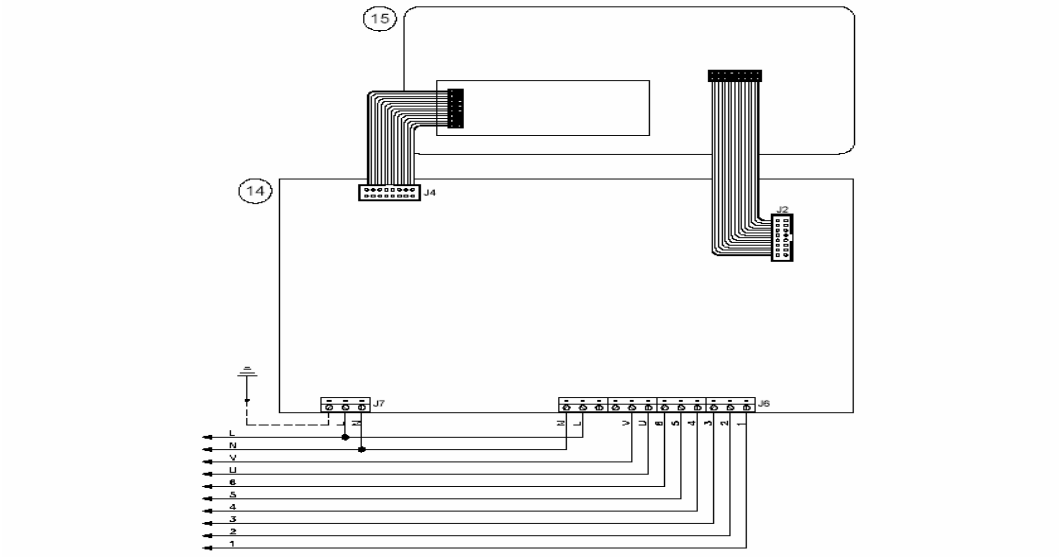
ANNEX A4 ELECTRIC DIAGRAM 230V





ANNEX A5 ELECTRIC DIAGRAM 110V





NUMBER	CODE	DESCRIPTION
1	70237	Filter HPF 110/250v
2	1852	Electrical Plug 2A
3	1852	Optional. Electrical Plug (divide power with 3) 1A +1A.
4	1403 1982	Fan 0,49Kw (Mod. PV, AV, BV) Fan 0,7Kw (Mod. CV)
5	1403	Fan 0,49Kw (AV, BV)
6	11164 11153 11154 14411	Fluorescent cool-white 18w (Mod. PV) Fluorescent cool-white 36w (Mod.AV) Fluorescent cool-white 58w (Mod.BV) Fluorescent 30w (Mod. CV)
7	14411	Fluorescent 30w (Mod CV)
8	18430	Electric Control panel
9	1283 1282	Optional. germicidal Kit 15w (Mod. PV) Optional. germicidal Kit 30w (Mod. AV, BV, CV)
10	2815 1336 1337 1335	Reactance 18w 220v (Mod. PV) Reactance 36w 220v (Mod. AV) Reactance 58w 220v (Mod. BV) Reactance 30w 220v (Mod. CV)
11	---------	------------------------------
12	2391 2018	Starter 2-22w (Mod. PV) Starter 4-80w (Mod. AV, BV, CV)
13	---------	------------------------------
14	15462	Power card
15	15463	Control Panel

ANNEX A6 IMPULSION FILTER LEAK TEST

PURPOSE

Check the no existence of leaks in the impulsion absolutes filters.

SCOPE

PV-100, AV-100, BV-100, CV-100.
PV-30/70, AV-30/70, BV-30/70, CV-30/70.

TOOLS

- Aerosol generator (cool or hot).
- Shell Ondina 15 Oil or Emery 3004.
- Photometer (ATI TDA 2-G).

METHODOLOGY

Turn on the photometer and adjust it for the measurements are in accordance to manufacturer's instructions. (Fig. 1).

Fig. 1

Introduce aerosol to the airflow before the filter (Fig. 2)

Fig. 2

With the probe nozzle approximately at 2,5 cms from the surface, scan the downstream side of the HEPA filters, including the perimeter of the filter passing the photometer probe over the entire surface.

Also scan the entire periphery of the filter and the junction between the filter and the frame a speed not exceeding 5 cms/s. (Fig. 3)

Fig. 3

ACCEPTATION CRITERIA

A “leak” will be considered when the photometer reading after the filter detects a bigger concentration than the 0,01% of the specific before the filter.

Fig. 4

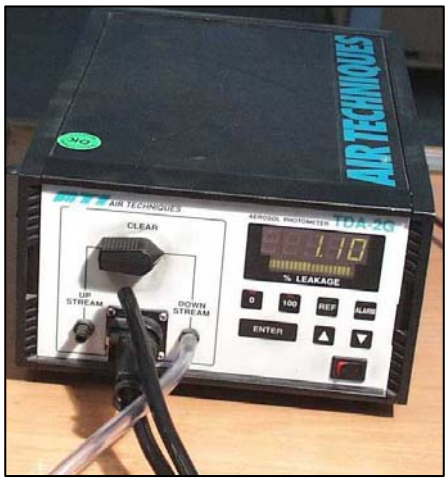


Fig. 5

Figure 4. Correct result: filter not leaking

Figure 5. Wrong result: filter leaking.

ANNEX A6.1. EXHAUST FILTER LEAK TEST

PURPOSE

Prove the not existence of leaks in the HEPA exhaust filters.

SCOPE

PV-100, AV-100, BV-100, CV-100.
PV-30/70, AV-30/70, BV-30/70, CV-30/70.

TOOLS

- Aerosol generator (cool or hot).
- Shell Ondina 15 Oil or Emery 3004.
- Photometer (ATI TDA 2-G).

METHODOLOGY

Turn on the photometer and adjust it for measurements in accordance with the manufacturer's instructions. (Fig. 1).

Fig. 1

Introduce aerosol to the airflow before the filter (Fig. 2)

Fig. 2

With the probe nozzle approximately at 2,5 cms from the surface, scan the downstream side of the HEPA filters, including the perimeter of the filter by passing the photometer probe over the entire surface.

Also scan the entire periphery of the filter and the junction between the filter and the frame not exceeding 5 cms/s. (Fig. 3)

Fig. 3

ACCEPTATION CRITERIA

A “leak” will be considered when the photometer reading after the filter detects a bigger concentration than the 0,01 % of the specific before the filter.

Fig. 4

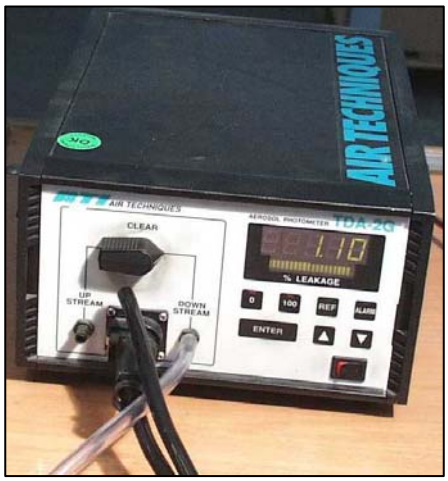


Fig. 5

Figure 4. Correct result: filter not leaking

Figure 5. Wrong result: filter leaking

ANNEX A6.2. IMPULSION FLOW VELOCITY TEST

PURPOSE

Check that the speed control in different points of the working area is suitable to achieve product protection. To determine the speed average as well as the uniformity range in the laminar flow zone.

SCOPE

PV-100, AV-100, BV-100, CV-100.
PV-30/70, AV-30/70, BV-30/70, CV-30/70.

TOOLS

The tool to use is an anemometer.

METHODOLOGY

The test must be done whereas the equipment is working.

Depending on the model of the cabinet, take as much lectures as indicated in the following table:

Model	Dimensions	Points
PV	762x610x68	6
AV	1220x610x68	6
BV	1525x610x68	6
CV	1830x610x68	8

The anemometer probe will be placed at a distance of 200 ± 50 mm of the filtering surface, in the laminar flow cabinets as figures 1 and 2.

Fig. 1

Fig. 2

For this calculation, we proceed to the following formula: $V_{Average}$ (m/s)= 1/n x (V_1 + V_2+ V_3 + ... V_n).

FILTERS V (m/s)	POINTS							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Average velocity (m/s)								

ACCEPTATION CRITERIA

PV and AV: The velocity average of the airflow in the working area surface will be 0,40 m/s ± 20%.

BV and CV: The velocity average of the airflow in the working area surface will be 0,35 m/s ± 20%.

ANNEX A6.3. EXHAUST VELOCITY TEST

PURPOSE

The purpose of this test is to calculate the exhaust airflow velocity to know its percentage.

SCOPE

PV-100, AV-100, BV-100, CV-100.
PV-30/70, AV-30/70, BV-30/70, CV-30/70.

TOOLS

The tool to use is an anemometer.

METHODOLOGY

The following process shall be performed while the equipment is working:

With the anemometer take three readings of the exhaust grill for the serie 100.

With the anemometer take three readings of the exhaust filter for the serie 30/70.

Point	**1**	**2**	**3**
Exhaust grill			

Exhaust velocity average (m/s)	
Exhaust flow (m^3/h)	
Impulsion velocity average (m/s)	
Impulsion flow (m^3/h)	
Exhaust percentage	

Fig. A

Fig. B

ACCEPTATION CRITERIA

Test results are considered to be satisfactory when the exhaust percentage is:
- SERIE 30/70: 30% ± 20%.
- SERIE 100: 10% ± 20%.

ANNEX A6.4 SMOKE TEST

PURPOSE

Verify the cabinet for product and personal protection.

SCOPE

PV-100, AV-100, BV-100, CV-100.
PV-30/70, AV-30/70, BV-30/70, CV-30/70.

TOOLS

Smoke generator.

METHODOLOGY

Product protection: Fume will be generated between the inferior part of the protector glass and the working surface. Visually, the fume behaviour will be checked.

User protection: Fume will be generated in the interior of the cabinet, near the glass. Visually, the fume behaviour will be checked.

ACCEPTATION CRITERIA

Turbulence in the working area shall not be created. The smoke generated should be dragged by the laminar flow to the surface of the working area.

Product protection.

The generated smoke in the outside of the front aperture will be dragged to the inflow area. No fume sign have to reach the working surface.

No smoke shall be refluxed out of the cabinet once drawn in, guaranteeing the protection of the operator and environnment.

ANNEX A6.5 LIGHT TEST

PURPOSE

Check that the level and uniformity of the lighting system is the correct one to guarantee a safety working area inside the cabinet.

SCOPE

PV-100, AV-100, BV-100, CV-100.
PV-30/70, AV-30/70, BV-30/70, CV-30/70.

TOOLS

Light meter.

METHODOLOGY

An imaginary division of the working surface will be done in equal parts (not more than 8, neither less than 6).

The illumination level will be measured in each of these parts, placing the light meter over the working area.

The average of the measures carried out will be calculated as well as the safety cabinet illumination level.

Point	1	2	3	4	5	6	7	8	Average
Value									

ACCEPTATION CRITERIA

The test will be correct is:

- The illumination level average is not less than 750 lux.
- Any individual reading can be less than the 70% of the average illumination level.

ANNEX A6.6 ACOUSTIC LEVEL TEST

PURPOSE

Verify that the noise level of the cabinet is in the allowed limits.

SCOPE

PV-100, AV-100, BV-100, CV-100.
PV-30/70, AV-30/70, BV-30/70, CV-30/70.

TOOLS

Sound meter.

METHODOLOGY

The sound meter is placed at 1m. from the front part of the cabinet and 1,5m high.

With the cabinet running, 2 or 3 readings will be taken for two different duration's (10 and 30 sec.).

Reading duration	Equipment switched-on			Partial Average (dB)
	1	2	3	
10 seg				
30 seg				
			Sub Total	

With the equipment switched-off, the previous procedure will be repeated.

Reading duration	Equipment switched-off			Partial Average (dB)
	1	2	3	
10 seg				
30 seg				
			Sub Total	

ACCEPTATION CRITERIA

Noise level: Less than 60dB.

ANNEX A6.7 DIFFERENTIAL PRESSURE TEST

PURPOSE

Know the filter differential pressure level.

SCOPE

PV-100, AV-100, BV-100, CV-100.
PV-30/70, AV-30/70, BV-30/70, CV-30/70.

TOOLS

Differential pressure gauge.

METHODOLOGY

Starting from the acknowledgement of the initial differential pressure (when the filter is new). To measure the differential pressure, proceed in the following way:

a) The pneumatic installation is disconnected (Fig. 1).

b) The differential pressure gauge is connected (Fig. 2).

Fig. 1

Fig. 2

ACCEPTATION CRITERIA

If the obtained pressure surpass between 3 or 4 mmca the initial differential pressure, then it will be considered than the filter is clogged.

As orienting values of clogging:

	Differential pressure (mmca)
New filter	10,5
Clogged filter	13,5 a 14,5

ANNEX A6.8 CERTIFICATE CE

CE DECLARACIÓN DE CONFORMIDAD	
Fabricante: *Manufacturer*:	TELSTAR TECHNOLOGIES, S.L. Av. Font i Sagué, 55 08227 Terrassa (Spain)
Descripción: *Desccription*:	**CABINAS ESTÉRILES POR FLUJO LAMINAR VERTICAL** ***VERTICAL LAMINAR FLOW CLEAN BENCHES***
Equipos: *Equipments*:	**PV-100, AV-100, BV-100, CV-100, PV-30/70, AV-30/70, BV-30/70, CV-30/70.**
Archivo del expediente técnico: *Body Retaining Technical File:*	Archivado por TELSTAR TECHNOLOGIES, S.L. *Retained by TELSTAR TECHNOLOGIES, S.L.*
DIRECTIVAS CE: ***EC DIRECTIVES:***	**DECLARACIÓN:** ***DECLARATION:***
Directiva de Máquinas **2006/42/CE** *Machinery Directive **2006/42/EC*** Directiva de Compatibilidad Electromagnética **2004/108/CE** *Electromagnetic Compatibility Directive **2004/108/EC*** Directiva de Baja Tensión **2006/95/EC** *Low Voltage Directive **2006/95/EC*** **EN-61010-1** (Equipos Laboratorio) ***EN-61010-1** (Laboratory Equipment)* Clasificación **ISO4** según **ISO 14644-1** ***ISO4** classification according **ISO 14644-1*** Normas de Construcción / *Manufacturing Standards*: **DIN 12950, DIN12980** y/*and* **EN 12649**	Por la presente, este documento certifica que los equipos arriba especificados cumplen con las normativas y Directivas CE mencionadas, y sus enmiendas. El equipo debe ser instalado, probado y usado estrictamente de acuerdo con las instrucciones de Telstar y usado por personal totalmente capacitado. Para el mantenimiento y reparación solo se deben usar piezas de recambio aprobadas por Telstar, montadas según las instrucciones de Telstar. *This document hereby certifies that the above equipments comply with the standards and EC Directives listed, and their amendments.* *The equipment must be installed, tested and operated in strict accordance with Telstar instructions and used by fully trained operators. Only approved Telstar spares must be used for maintenance and repair and fitted in accordance with Telstar instructions.*
Firmado por: *Signed by:*	Mónica Martín
Cargo: *Title:*	Responsable de calidad *Quality Manager*
Fecha: *Date:*	Junio 2010 *June 2010*

ANNEX A6.9 GUARANTEE CERTIFICATE

TELSTAR TECHNOLOGIES, S.L. guarantees the substitution of all the defect pieces in the period of TWO YEARS, starting in the date of the expedition of the equipment.

This equipment has undergone satisfactorily all the tests and revisions. Therefore, any damage caused by transport, wrong installation or inappropriate use is excluded of this guarantee.

This guarantee does not include any of the fungible materials comprised in the equipment, such as filters, fluids, filaments, etc.

The inappropriate use of the equipment excludes TELSTAR TECHNOLOGIES, S.L. of any responsibility for eventual direct or indirect damages of any nature.

Likewise, this guarantee will be void if pieces other than the ones supplied by TELSTAR TECHNOLOGIES, S.L. are used for the repairing of the equipment.

NOTE. This guarantee is valid for all the equipment unless otherwise stated. In order to obtain any information about this guarantee, please contact with our Sales Department.